

In the Claims

Please amend claims 15, 16, 17, and 40 as follows:

15. (Currently Amended) A fluid transport passageway structure integrally associated and in combination with bi-polar electrode plate assembly of a fuel cell system, characterized in that bi-polar electrode plate assembly comprises an anodic electrode structure bonded together with an opposing cathodic electrode structure, wherein the anodic electrode structure comprises:

one or more anodic fluid delivery channels positioned on a first side of the anodic electrode structure;

one or more anodic fluid removal channels positioned on a second side of the anodic electrode structure, wherein the second side is substantially parallel to the first side of the anodic electrode structure; and

one or more porous bulk matrix anodic fluid transport regions, wherein each porous bulk matrix anodic fluid transport region is positioned in between at least (i) one of the one or more anodic fluid delivery channels, and (ii) one of the one or more ~~cathodic~~ anodic fluid removal channels, and wherein each porous bulk matrix anodic fluid transport region is in fluidic communication with at least one of the one or more anodic fluid delivery channels and at least one of the one or more anodic fluid removal channels; and wherein the cathodic electrode assembly comprises:

at least one porous bulk matrix cathodic fluid transport region in fluidic communication with an inlet passage and an outlet passage, wherein the porous bulk matrix cathodic fluid transport region is adapted to hydrodynamically flow a gas or liquid therethrough, and wherein the porous bulk cathodic matrix fluid transport region is in fluid communication with the inlet passage and the outlet passage.

16. (Currently Amended) A plurality of fluid transport and flow channel passageway structures integrally associated with a fuel cell electrode stack assembly of a fuel cell system, comprising:

a first end cap assembly having a first fluid inlet port and second fluid outlet port;

a second end cap assembly having a third fluid inlet port and a fourth fluid outlet port; and

a plurality of bi-polar electrode plate assemblies interposed between the first and second end cap assemblies, wherein each of the bi-polar plate assemblies comprises an anodic electrode structure bonded together with an opposing cathodic electrode structure, wherein the anodic electrode structure comprises (i) one or more anodic fluid delivery channels positioned on a first side of the anodic electrode structure, (ii) one or more anodic fluid removal channels positioned on a second side of the anodic electrode structure, wherein the second side is substantially parallel to the first side of the anodic electrode structure, and (iii) one or more porous bulk matrix anodic fluid transport regions, wherein each porous bulk matrix anodic fluid transport region is positioned in between at least (a) one of the one or more anodic fluid delivery channels, and (b) one of the one or more ~~cathodic~~ anodic fluid removal channels, and wherein each porous bulk matrix anodic fluid transport region is in fluidic communication with at least one of the one or more anodic fluid delivery channels and at least one of the one or more anodic fluid removal channels; and wherein the cathodic electrode assembly comprises at least one porous bulk matrix cathodic fluid transport region in fluidic communication with an inlet passage and an outlet passage, wherein the porous bulk matrix cathodic fluid transport region is adapted to hydrodynamically flow a gas or liquid therethrough, and wherein the porous bulk cathodic matrix fluid transport region is in fluid communication with the inlet passage and the outlet passage.

17. (Currently Amended) A direct liquid feed fuel cell system comprising:

an anode derived from a first planar silicon substrate;

a cathode derived from a second planar silicon substrate; and

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a liquid electrolyte that ionically connects the anode to the cathode;

wherein the anode and the cathode are spaced apart and substantially parallel to each other so as to define a spaced apart region, and wherein the liquid electrolyte is interposed between the anode and the cathode and within the spaced apart region.

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40. (Currently Amended) A direct liquid feed fuel cell system comprising:

a porous anode structure;

a porous cathode structure; and

a liquid fuel and electrolyte mixture that ionically connects the anode to the cathode;

22

wherein the anode structure and the cathode structure are spaced apart and substantially parallel to each other so as to define a spaced apart region, and wherein the liquid fuel and electrolyte mixture is interposed between the anode structure and the cathode structure and within the spaced apart region, and wherein the porous anode structure is in fluid communication with the spaced apart region and is adapted to flow the liquid fuel and electrolyte mixture therethrough, and wherein the porous anode structure has inner pore surfaces that have (i) a catalyst uniformly deposited thereon, and (ii) a polymeric ~~catalyst~~ electrolyte uniformly deposited thereon.

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